

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

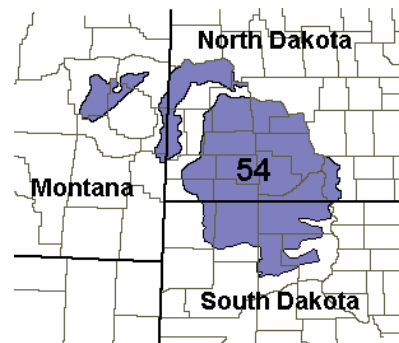
Site Name: Limy Sands

Site Type: Rangeland

Site ID: R054XY045ND

Major Land Resource Area: 54 – Rolling Soft Shale Plain

For more information on MLRA's refer to the following web site:
http://www.essc.psu.edu/soil_info/soil_lrr/



Physiographic Features

This site typically occurs on moderately sloping to steep sedimentary uplands.

Landform: hill, knoll and ridge

Aspect: NA

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1600	3600
Slope (percent):	6	35
Water Table Depth (inches):	None	None
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Very low	Low

Climatic Features

MLRA 54 is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature are characteristic. The climate is the result of this MLRA's location in the geographic center of North America. There are few natural barriers on the northern Great Plains. The air masses move unobstructed across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 14 to 18 inches per year. The normal average annual temperature is about 42° F. January is the coldest month with average temperatures ranging from about 13° F (Beach, ND) to about 16° F (Bison, SD). July is the warmest month with temperatures averaging from about 69° F (Beach, ND) to about 72° F (Timber Lake, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 57° F. This large annual range attests to the continental nature of this MLRA's climate. Hourly winds are estimated to average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of native cool-season plants begins in late March and continues to early to mid July. Native warm-season plants begin growth in mid May and continue to the end of August. Green up of cool-season plants can occur in September and October when adequate soil moisture is present.

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	119	136
Freeze-free period (days):	139	157
Mean Annual Precipitation (inches):	14	18

Average Monthly Precipitation (inches) and Temperature (°F):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.41	0.54	2.2	23.8
February	0.37	0.61	8.7	30.4
March	0.51	1.07	17.1	40.0
April	1.13	1.88	28.9	56.8
May	1.98	2.83	40.5	69.3
June	2.83	3.29	49.8	78.3
July	2.05	2.25	54.6	85.2
August	1.49	2.07	53.0	84.3
September	1.29	1.45	42.0	73.4
October	0.89	1.35	31.6	60.4
November	0.48	0.61	19.0	41.5
December	0.42	0.55	8.1	29.0

Climate Stations		Period	
Station ID	Location or Name	From	To
ND0590	Beach	1949	1999
MT7560	Sidney	1949	1999
SD8307	Timber Lake	1948	1999
ND2183	Dickinson FAA AP	1948	1999

For local climate stations that may be more representative, refer to <http://www.wcc.nrcs.usda.gov>.

Influencing Water Features

No significant water features influence this site.

Representative Soil Features

The common features of soils in this site are the loamy fine sand and loamy sand textured substratum and slopes of 6 to 35 percent. The soils in this site are somewhat excessively drained and formed in soft sandstone. The loamy fine sand to fine sandy loam surface layer is 4 to 6 inches thick. The soils have a rapid infiltration rate. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers, and there is a risk of rills and eventually gullies if vegetative cover is not adequate. Pedestalling of plants occurs. The soil surface is unstable and slumping, erosion and deposition is common to the site. Cryptobiotic crusts are present. These soils are susceptible to water and wind erosion. Severe loss of the soil surface layer can result in a shift in species composition and/or production.

Major soil series correlated to this ecological site can be found in Section II of the Natural Resources Conservation Service Field Office Technical Guide or the following web sites:

North Dakota <http://www.nd.nrcs.usda.gov/>

South Dakota <http://www.sd.nrcs.usda.gov/>

Montana <http://www.mt.nrcs.usda.gov/>

Parent Material Kind: residuum
Parent Material Origin: sandstone, calcareous
Surface Texture: loamy fine sand, loamy sand
Surface Texture Modifier: none
Subsurface Texture Group: sandy
Surface Fragments $\leq 3''$ (% Cover): 0
Surface Fragments $> 3''$ (%Cover): 0
Subsurface Fragments $\leq 3''$ (% Volume): 0-20
Subsurface Fragments $> 3''$ (% Volume): 0-10

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	somewhat excessive	somewhat excessive
Permeability Class:	rapid	rapid
Depth to first restrictive layer (inches):	20	>72
Electrical Conductivity (mmhos/cm)*:	0	4
Sodium Absorption Ratio*:	0	5
Soil Reaction (1:1 Water)*:	6.6	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	2	3
Calcium Carbonate Equivalent (percent)*:	0	15

* - These attributes represent from 0-40 inches or to the first restrictive layer.

Plant Communities

Ecological Dynamics of the Site:

The site developed under Northern Great Plains climatic conditions, and included natural influence of large herbivores and occasional fire. Changes will occur in the plant communities due to management actions and/or climatic conditions. Due to the nature of the soils, the site is considered quite fragile. Under continued adverse impacts, a rapid decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can slowly return to the Historic Climax Plant Community (HCPC).

The plant community upon which interpretations are primarily based is the Historic Climax Plant Community (HCPC). The HCPC has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Subclimax plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

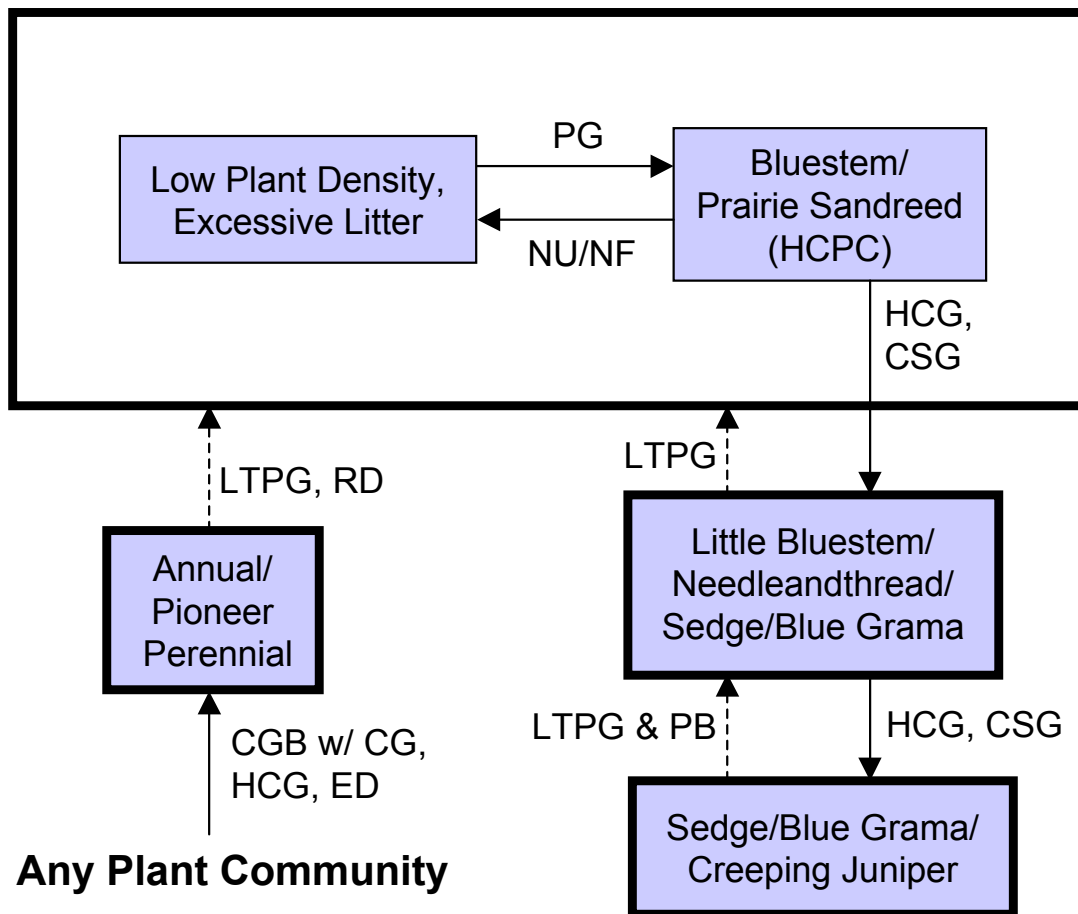
Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the HCPC. Species such as little bluestem, blue grama and sedges will initially increase. Big bluestem, sand bluestem, porcupine grass and sideoats grama will decrease in frequency and production. Heavy continuous grazing cause sedges, blue grama and creeping juniper to increase, while little bluestem stays in wolf plant colonies.

In time, heavy continuous grazing will likely cause upland sedges and blue grama to dominate and pioneer perennials, annuals, and club moss (in its range) to increase. This plant community is relatively stable and the competitive advantage prevents other species from establishing. This plant community is less productive than the HCPC. Runoff increases and infiltration will decrease. Soil erosion could be critical.

Under extended periods of non-use and/or lack of fire will result in a plant community having low plant densities and open spaces, which favors an increase in annuals, biennials and pioneering perennials. Such species are red threeawn, sweetclover, cheatgrass, sand dropseed and Scribner's panicum. In time, shrubs such as cactus and creeping juniper will increase.

The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



CGB w/ CG - cropped go-back with continuous grazing; **CSG** - continuous seasonal grazing; **ED** - excessive defoliation; **HCG** - heavy continuous grazing; **HCPC** - Historical Climax Plant Community; **LTPG** - long-term prescribed grazing; **NU/NF** - extended period of non-use & no fire; **PB** - prescribed burning; **PG** - prescribed grazing; **RD** - removal of disturbance.

Plant Community Composition and Group Annual Production

		Bluestem/Prairie Sandreed (HCPQ)			
COMMON/GROUP NAME	SYMBOL	Group	lbs./acre	% Comp	
GRASSES & GRASS-LIKES			1530 - 1710	85 - 95	
BLUESTEM		1	180 - 270	10 - 15	
sand bluestem	ANHA	1	180 - 270	10 - 15	
big bluestem	ANGE	1	0 - 90	0 - 5	
		2	270 - 450	15 - 25	
prairie sandreed	CALO	2	90 - 360	5 - 20	
little bluestem	SCSC	2	90 - 360	5 - 20	
NEEDLEGRASS		3	90 - 180	5 - 10	
needleandthread	HECOC8	3	72 - 144	4 - 8	
porcupine grass	HESP11	3	36 - 144	2 - 8	
GRAMA		4	90 - 270	5 - 15	
sideoats grama	BOCU	4	90 - 180	5 - 10	
blue grama	BOGR2	4	90 - 144	5 - 8	
hairy grama	BOHI2	4	0 - 90	0 - 5	
OTHER NATVE GRASSES		5	54 - 126	3 - 7	
Scribner panicum	DIOLS	5	18 - 36	1 - 2	
western wheatgrass	PASM	5	0 - 54	0 - 3	
sand dropseed	SPCR	5	18 - 36	1 - 2	
prairie junegrass	KOMA	5	18 - 36	1 - 2	
plains muhly	MUCU3	5	18 - 36	1 - 2	
red threeawn	ARPUL	5	18 - 36	1 - 2	
other perennial grasses	2GP	5	18 - 36	1 - 2	
GRASS-LIKES		6	126 - 216	7 - 12	
threadleaf sedge	CAFI	6	108 - 180	6 - 10	
sun sedge	CAINH2	6	36 - 54	2 - 3	
other grass-likes	2GL	6	0 - 18	0 - 1	
FORBS		7	90 - 180	5 - 10	
American pasqueflower	PUPA5	7	18 - 36	1 - 2	
bracted spiderwort	TRBR	7	18 - 18	1 - 1	
cutleaf ironplant	MAPI	7	0 - 18	0 - 1	
erigonum	ERIOG	7	0 - 18	0 - 1	
gayfeather	LIATR	7	18 - 36	1 - 2	
goldenrod	SOLID	7	18 - 36	1 - 2	
green sagewort	ARDR4	7	18 - 36	1 - 2	
hairy goldaster	HEV4	7	18 - 36	1 - 2	
Hood's phlox	PHHO	7	0 - 18	0 - 1	
Indian breadroot	PEES	7	0 - 18	0 - 1	
Lambert crazyweed	OXL43	7	18 - 36	1 - 2	
penstemon	PENST	7	18 - 36	1 - 2	
plains milkvetch	ASGI5	7	0 - 18	0 - 1	
prairie coneflower	RACO3	7	0 - 18	0 - 1	
prairie smoke	GETR	7	0 - 18	0 - 1	
purple coneflower	ECAN2	7	18 - 36	1 - 2	
pussytoes	ANTEN	7	0 - 18	0 - 1	
rush skeletonweed	LYJU	7	18 - 18	1 - 1	
scarlet globemallow	SPCO	7	18 - 18	1 - 1	
scurfpea	PSORA2	7	18 - 36	1 - 2	
silky prairie clover	DAVI	7	0 - 36	0 - 2	
stiff sunflower	HEPA19	7	18 - 18	1 - 1	
wavyleaf thistle	CIUN	7	0 - 18	0 - 1	
western wallflower	ERCAC	7	18 - 18	1 - 1	
other perennial forbs	2FP	7	0 - 18	0 - 1	
SHRUBS		8	36 - 90	2 - 5	
cactus	OPUNT	8	0 - 18	0 - 1	
creeping juniper	JUHO2	8	0 - 18	0 - 1	
dwarf false indigo	AMNA	8	0 - 18	0 - 1	
fringed sagewort	ARFR4	8	18 - 18	1 - 1	
leadplant	AMCA6	8	18 - 36	1 - 2	
rose	ROSA5	8	18 - 18	1 - 1	
shrubby cinquefoil	DAFL3	8	0 - 18	0 - 1	
skunkbush sumac	RHTR	8	0 - 18	0 - 1	
western sandcherry	PRPUB	8	0 - 18	0 - 1	
yucca	YUGL	8	0 - 18	0 - 1	
other shrubs	2SHRUB	8	0 - 18	0 - 1	
TREES		9	0 - 18	0 - 1	
juniper	JUNIP	9	0 - 18	0 - 1	
Annual Production lbs./acre			LOW	RV	HIGH
GRASSES & GRASS-LIKES			980 -	1593 -	2200
FORBS			85 -	135 -	185
SHRUBS			35 -	63 -	95
TREES			0 -	9 -	20
TOTAL			1100 -	1800 -	2500

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Relative Value.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	Bluestem/Prairie Sandreed (HCPC)			Low Plant Density, Excessive Litter			Little Bluestem/Needleand- thread/Sedge/Blue Grama			Sedge/Blue Grama/ Creeping Juniper		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1530 - 1710	85 - 95		1280 - 1440	80 - 90		510 - 570	85 - 95		360 - 405	80 - 90
BLUESTEM		1	180 - 270	10 - 15	1	80 - 128	5 - 8	1	0 - 12	0 - 2	1		
sand bluestem	ANHA	1	180 - 270	10 - 15	1	80 - 128	5 - 8	1	0 - 12	0 - 2			
big bluestem	ANGE	1	0 - 90	0 - 5	1	0 - 16	0 - 1						
		2	270 - 450	15 - 25	2	160 - 240	10 - 15	2	60 - 120	10 - 20	2	0 - 18	0 - 4
prairie sandreed	CALO	2	90 - 360	5 - 20	2	80 - 160	5 - 10	2	0 - 12	0 - 2			
little bluestem	SCSC	2	90 - 360	5 - 20	2	80 - 240	5 - 15	2	60 - 120	10 - 20	2	0 - 18	0 - 4
NEEDLEGRASS		3	90 - 180	5 - 10	3	80 - 240	5 - 15	3	60 - 120	10 - 20	3	9 - 23	2 - 5
needleandthread	HECOC8	3	72 - 144	4 - 8	3	80 - 240	5 - 15	3	60 - 120	10 - 20	3	9 - 23	2 - 5
porcupine grass	HESP11	3	36 - 144	2 - 8	3	16 - 80	1 - 5						
GRAMA		4	90 - 270	5 - 15	4	80 - 160	5 - 10	4	60 - 120	10 - 20	4	68 - 126	15 - 28
sideoats grama	BOCU	4	90 - 180	5 - 10	4	48 - 112	3 - 7	4	0 - 30	0 - 5	4	0 - 9	0 - 2
blue grama	BOGR2	4	90 - 144	5 - 8	4	32 - 64	2 - 4	4	60 - 120	10 - 20	4	68 - 126	15 - 28
hairy grama	BOHI2	4	0 - 90	0 - 5	4	0 - 48	0 - 3	4	0 - 30	0 - 5	4	0 - 23	0 - 5
OTHER NATIVE GRASSES		5	54 - 126	3 - 7	5	80 - 160	5 - 10	5	18 - 42	3 - 7	5	23 - 45	5 - 10
Scribner panicum	DIOL8	5	18 - 36	1 - 2	5	32 - 48	2 - 3	5	12 - 18	2 - 3	5	5 - 9	1 - 2
western wheatgrass	PASM	5	0 - 54	0 - 3	5	48 - 80	3 - 5	5	0 - 6	0 - 1	5	0 - 5	0 - 1
sand dropseed	SPCR	5	18 - 36	1 - 2	5	48 - 96	3 - 6	5	18 - 30	3 - 5	5	23 - 32	5 - 7
prairie junegrass	KOMA	5	18 - 36	1 - 2	5	16 - 32	1 - 2	5	6 - 18	1 - 3	5	5 - 14	1 - 3
plains muhly	MUCU3	5	18 - 36	1 - 2	5	0 - 16	0 - 1						
red threeawn	ARPUL	5	18 - 36	1 - 2	5	32 - 64	2 - 4	5	18 - 30	3 - 5	5	18 - 32	4 - 7
sandbur	CELO3				5	0 - 16	0 - 1	5	0 - 12	0 - 2	5	0 - 5	0 - 1
sixweeks fescue	VUOC				5	0 - 16	0 - 1	5	0 - 6	0 - 1	5	0 - 5	0 - 1
other perennial grasses	ZGP	5	18 - 36	1 - 2	5	16 - 32	1 - 2	5	0 - 6	0 - 1	5	0 - 5	0 - 1
GRASS-LIKES		6	126 - 216	7 - 12	6	160 - 320	10 - 20	6	48 - 84	8 - 14	6	90 - 144	20 - 32
threadleaf sedge	CAFI	6	108 - 180	6 - 10	6	160 - 288	10 - 18	6	30 - 66	5 - 11	6	90 - 144	20 - 32
sun sedge	CANH2	6	36 - 54	2 - 3	6	32 - 48	2 - 3	6	0 - 6	0 - 1	6	0 - 5	0 - 1
other grass-likes	ZGL	6	0 - 18	0 - 1	6	0 - 16	0 - 1	6	0 - 6	0 - 1	6	0 - 5	0 - 1
NON-NATIVE GRASSES		7			7	0 - 32	0 - 2	7	0 - 6	0 - 1	7		
cheatgrass	BRTE				7	0 - 32	0 - 2	7	0 - 6	0 - 1			
FORBS		8	90 - 180	5 - 10	8	80 - 160	5 - 10	8	30 - 60	5 - 10	8	29 - 45	5 - 10
American pasqueflower	PUPA5	8	18 - 36	1 - 2	8	0 - 16	0 - 1	8	18 - 30	3 - 5	8	18 - 27	4 - 6
bracted spiderwort	TRBR	8	18 - 18	1 - 1	8	0 - 16	0 - 1						
cutleaf ironplant	MAPI	8	0 - 18	0 - 1	8	0 - 16	0 - 1	8	6 - 12	1 - 2			
erigonum	ERIOG	8	0 - 18	0 - 1	8	0 - 16	0 - 1	8	0 - 6	0 - 1			
gayfeather	LIATR	8	18 - 36	1 - 2	8	0 - 16	0 - 1	8	0 - 6	0 - 1			
goldenrod	SOLID	8	18 - 36	1 - 2	8	0 - 16	0 - 1	8	0 - 6	0 - 1	8	0 - 5	0 - 1
green sawwort	ARDR4	8	18 - 36	1 - 2	8	32 - 48	2 - 3	8	18 - 30	3 - 5	8	18 - 27	4 - 6
hairy goldaster	HEVI4	8	18 - 36	1 - 2	8	32 - 48	2 - 3	8	12 - 18	2 - 3	8	5 - 9	1 - 2
Hood's phlox	PHHO	8	0 - 18	0 - 1	8	0 - 16	0 - 1	8	6 - 6	1 - 1	8	5 - 5	1 - 1
Indian breadroot	PEES	8	0 - 18	0 - 1	8	0 - 16	0 - 1						
Lambert crazyweed	OXLA3	8	18 - 36	1 - 2	8	0 - 16	0 - 1	8	12 - 18	2 - 3	8	5 - 9	1 - 2
penstemon	PENST	8	18 - 36	1 - 2	8	0 - 16	0 - 1						
plains milkvetch	ASGI5	8	0 - 18	0 - 1	8	0 - 16	0 - 1						
prairie coneflower	RACO3	8	0 - 18	0 - 1	8	16 - 32	1 - 2	8	6 - 12	1 - 2	8	5 - 9	1 - 2
prairie smoke	GETR	8	0 - 18	0 - 1	8	0 - 16	0 - 1						
purple coneflower	ECAN2	8	18 - 36	1 - 2	8	16 - 32	1 - 2	8	0 - 6	0 - 1			
pussytoes	ANTEN	8	0 - 18	0 - 1	8	16 - 16	1 - 1	8	6 - 6	1 - 1	8	5 - 5	1 - 1
rush skeletonweed	LYJU	8	18 - 18	1 - 1	8	16 - 16	1 - 1	8	6 - 12	1 - 2	8	5 - 9	1 - 2
scarlet globemallow	SPCO	8	18 - 18	1 - 1	8	16 - 16	1 - 1	8	6 - 12	1 - 2	8	5 - 9	1 - 2
scurfpea	PSORA2	8	18 - 36	1 - 2	8	16 - 32	1 - 2	8	12 - 18	2 - 3	8	5 - 9	1 - 2
silky prairie clover	DAVI	8	0 - 36	0 - 2	8	0 - 16	0 - 1						
stiff sunflower	HEPA19	8	18 - 18	1 - 1	8	0 - 16	0 - 1						
wayleaf thistle	CIUN	8	0 - 18	0 - 1	8	16 - 32	1 - 2	8	6 - 6	1 - 1	8	5 - 5	1 - 1
western ragweed	AMPS				8	16 - 48	1 - 3	8	6 - 18	1 - 3	8	5 - 9	1 - 2
western wallflower	ERCAC	8	18 - 18	1 - 1	8	0 - 16	0 - 1	8	0 - 6	0 - 1			
other perennial forbs	ZFP	8	0 - 18	0 - 1	8	0 - 16	0 - 1	8	0 - 6	0 - 1	8	0 - 5	0 - 1
other annual forbs	ZFA				8	16 - 16	1 - 1	8	0 - 6	0 - 1	8	0 - 5	0 - 1
SHRUBS		9	36 - 90	2 - 5	9	64 - 128	4 - 8	9	6 - 30	1 - 5	9	29 - 45	5 - 10
cactus	OPUNT	9	0 - 18	0 - 1	9	16 - 48	1 - 3	9	6 - 12	1 - 2	9	5 - 14	1 - 3
creeping juniper	JUHO2	9	0 - 18	0 - 1	9	16 - 32	1 - 2	9	6 - 18	1 - 3	9	23 - 45	5 - 10
dwarf false indigo	AMNA	9	0 - 18	0 - 1	9	0 - 16	0 - 1						
fringed sawwort	ARFR4	9	18 - 18	1 - 1	9	16 - 48	1 - 3	9	12 - 18	2 - 3	9	14 - 23	3 - 5
leadplant	AMCA6	9	18 - 36	1 - 2	9	16 - 32	1 - 2						
rose	ROSA5	9	18 - 18	1 - 1	9	16 - 32	1 - 2	9	0 - 6	0 - 1	9	0 - 5	0 - 1
shrubby cinquefoil	DAFL3	9	0 - 18	0 - 1	9	16 - 32	1 - 2						
skunkbush sumac	RHTR	9	0 - 18	0 - 1	9	16 - 32	1 - 2						
western sandcherry	PRPUB	9	0 - 18	0 - 1	9	16 - 16	1 - 1						
yucca	YUGL	9	0 - 18	0 - 1	9	16 - 32	1 - 2	9	6 - 12	1 - 2	9	0 - 5	0 - 1
other shrubs	ZSHRUB	9	0 - 18	0 - 1	9	0 - 16	0 - 1	9	0 - 6	0 - 1			
TREES		10	0 - 18	0 - 1	10	16 - 32	1 - 2	10	0 - 6	0 - 1	10	0 - 5	0 - 1
juniper	JUNIP	10	0 - 18	0 - 1	10	16 - 32	1 - 2	10	0 - 6	0 - 1	10	0 - 5	0 - 1
Annual Production lbs./acre		LOW RV HIGH			LOW RV HIGH			LOW RV HIGH			LOW RV HIGH		
GRASSES & GRASS-LIKES		980 - 1593 - 2200			850 - 1360 - 1970			375 - 534 - 690			260 - 380 - 495		
FORBS		85 - 135 - 185			75 - 120 - 165			25 - 45 - 65			20 - 34 - 50		
SHRUBS		35 - 63 - 95			60 - 96 - 130			0 - 18 - 35			20 - 34 - 50		
TREES		0 - 9 - 20			15 - 24 - 35			0 - 3 - 10			0 - 2 - 5		
TOTAL		1100 - 1800 - 2500			1000 - 1600 - 2300			400 - 600 - 800			300 - 450 - 600		

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Relative value.

Plant Community and Vegetation State Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data are collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as "Desired Plant Communities". According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC's) will be determined by the decision-makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

Bluestem/Prairie Sandreed Plant Community

This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC). This community evolved with grazing by large herbivores and occasional prairie fire. It is well suited for grazing by domestic livestock and can be found on areas that are properly managed with prescribed grazing that allows for proper utilization, changes in season of use and adequate recovery periods following each grazing event.

The potential vegetation is about 84% grasses or grass-like plants, 10% forbs, 5% shrubs and 1% trees. Warm season grasses dominate the plant community. The co-dominant grasses include prairie sandreed, little bluestem, big bluestem and sand bluestem. Other grasses and grass-like plants occurring on the site include needleandthread, blue grama, porcupine grass, sideoats grama and sedges. Significant forbs include penstemon, American vetch, dotted gayfeather, prairie coneflower, pasqueflower, green sagewort, silverleaf scurfpea and spiderwort. Leadplant, yucca, dwarf false indigo, rose, western sandcherry and creeping juniper are the principal shrubs.

This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. Run-off from adjacent sites and moderate or high available water capacity provides a favorable soil-water-plant relationship. This is a healthy and sustainable plant community.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year:

Growth curve number: ND5403

Growth curve name: Missouri Slope, Native Grasslands, Warm-season dominant.

Growth curve description: Warm-season, tall/mid grass dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	4	17	40	30	8	1	0	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Non-use and no fire for extended periods of time will convert this plant community to the *Low Plant Density, Excessive Litter Plant Community*.
- Heavy, continuous grazing will convert the plant community to the *Little Bluestem/Needleandthread/ Sedge/Blue Grama Plant Community*.
- Continuous seasonal grazing (i.e., annual, early spring grazing) will convert the plant community to the *Little Bluestem/Needleandthread/Sedge/Blue Grama Plant Community*.
- Excessive defoliation (i.e., areas of heavy animal concentration) will convert the plant community to the *Annual/Pioneer Perennial Plant Community*.

- Go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

Little Bluestem/Needleandthread/Sedge/Blue Grama Plant Community

This plant community is the result of long-term, heavy, continuous grazing and/or annual, early spring seasonal grazing. Short grasses, grass-likes, little bluestem and forbs increase to dominate the site and annual production decreases dramatically. Ungrazed little bluestem seed stalks resist grazing pressure from most grazing animals causing a “red grass” patchy appearance amongst larger areas dominated by short grasses. Lack of litter and reduced plant vigor in the short grass areas result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, which gives the early growth sedges and drought resistant blue grama a competitive advantage over the tall warm-season grasses and cool season mid-grasses. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur. Sedges, blue grama and patches of little bluestem are the dominant species with the balance being a few species of cool-season grasses and warm-season grasses including red threeawn, sand dropseed, needleandthread and Scribner panicum. Forbs such as western ragweed, green sagewort, hairy goldaster, American pasqueflower, Lambert crazyweed, scurfpea and prairie coneflower may also be present. Dominant shrubs are cactus, yucca, fringed sagewort and creeping juniper. There is usually less than 15% bare ground.

This plant community is very stable. The likelihood of this plant community to head away from the HCPC is greater than moving towards HCPC if management does not change. Runoff has increased and infiltration has decreased. Soil erosion is apparent as per many pedestalled plants and debris dams existing throughout the site, especially on the steeper slopes. This plant community is less productive than the HCPC.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year:

Growth curve number: ND5408

Growth curve name: Missouri Slope, Sedge Dominant.

Growth curve description: Cool-season, short grasses and grass-likes.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	30	25	20	5	5	2	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Long term prescribed grazing or prescribed burning followed by long term prescribed grazing that includes changing season of use and allowing adequate recovery periods to enhance cool season grasses will slowly lead this plant community back to the *Bluestem/Prairie Sandreed Plant Community*.
- Heavy, continuous grazing and/or continuous seasonal grazing, (i.e. annual early spring grazing), will cause further deterioration resulting in a shift to the *Sedge/Blue Grama/Creeping Juniper Plant Community*.
- Heavy, continuous grazing and/or excessive defoliation may shift this plant community to the *Annual/Pioneer Perennial Plant Community*.

Low Plant Density, Excessive Litter Plant Community

This plant community develops after an extended period of 15 or more years of non-use by herbivores and exclusion of fire. This plant community is dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is a typical pattern found in pastures grazed season-long. Plant litter may accumulate as this plant community first develops. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to colonies.

Standing decadent plants and moderate litter covers shorter understory species (i.e. short grasses and sedges), restricting their ability to capture adequate sunlight for photosynthesis. Vigor and diversity of native plants are reduced. Annual and/or biennial forbs, annual grasses, and cryptogams commonly fill interspaces once occupied by desirable species.

Kentucky bluegrass, crested wheatgrass, smooth brome grass, cheatgrass and/or sweetclover tend to invade and may dominate this plant community. Other grasses present include needleandthread, western wheatgrass, Scribner panicum, sand dropseed, red threeawn and threadleaf sedge. The common forbs include green sagewort, prairie coneflower, and hairy golden aster. Fringed sagewort, rose, yucca, cactus, creeping juniper and Rocky Mountain juniper are principal shrubs and tend to increase in density and cover.

This plant community is resistant to change without prescribed grazing or fire. Grazing is most effective in moving this plant community towards the HCPC. Soil erosion is low. Compared to the HCPC, infiltration is reduced to the lower root zone. Runoff is similar to the HCPC. Once this plant community is reached, any of the preferred treatments can readily return the diversity and production of the site.

The following growth curve represents monthly percentages of total annual growth of the dominant species during a normal year.

Growth curve number: ND5406

Growth curve name: Missouri Slope, Introduced Cool-season Grasses.

Growth curve description: Introduced cool-season grasses.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	35	35	5	2	8	2	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Prescribed grazing or prescribed burning followed by prescribed grazing will move this plant community toward the *Bluestem/Prairie Sandreed Plant Community (HCPC)*. This would require longer-term management with prescribed grazing and/or prescribed burning under controlled conditions.

Sedge/Blue Grama/Creeping Juniper Plant Community

This plant community can quickly develop from the adverse effects of continuous heavy grazing over several years. Diversity is lost as the short grasses become dominant in the plant community. Little bluestem and needleandthread have been reduced greatly compared to the Sedge/Blue Grama/Little Bluestem Plant Community and are replaced by the grazing tolerant blue grama and sedges.

Sideoats grama remains in the plant community, but is less productive because of the mid-summer grazing pressure. Because they are less palatable, American pasqueflower and green sagewort become more prevalent in the plant community.

The herbaceous species present are less suitable to grazing. There is more than 20% bare ground. Litter is usually non-existent which reduces infiltration, increasing run-off and soil erosion. The soil temperature is hot early and continues throughout the rest of the growing season. These management induced environmental factors greatly influence this plant community and is why this vegetation state is very resistant to change. Once this plant community is reached, any of the preferred treatments will very slowly return the diversity and production of the site. This will take 25+ years.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year:

Growth curve number: ND5408

Growth curve name: Missouri Slope, Sedge Dominant.

Growth curve description: Cool-season, short grasses and grass-likes.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	30	25	20	5	5	2	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Long-term prescribed grazing that includes changing season of use and allowing adequate recovery periods to enhance cool season grasses will slowly (10+ years) lead this plant community back to the *Little Bluestem/Needleandthread/Sedge/Blue Grama Plant Community*.
- Heavy, continuous grazing and/or excessive defoliation will shift this plant community to the *Annual/Pioneer Perennial Plant Community*.
- Cropped go-back land with continuous grazing will convert this plant community to the *Annual/Pioneer Perennial Plant Community*.

Annual/Pioneer Perennial Plant Community

This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or wildlife concentration, and cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include red threeawn, little bluestem, smooth brome, crested wheatgrass, annual brome, needleandthread, sand dropseed, sandbur, Scribner's Panicum and little bluestem.. The dominant forbs include curlycup gumweed, maretail, salsify, kochia, field bindweed, thistles, western ragweed, pussytoes, prostrate verbena and other early successional species. Shrubs that may be present include prairie rose, fringed sagewort and cactus. Plant species from adjacent ecological sites may become minor components of this plant community.

This plant community is resistant to change, as long as soil disturbance or severe vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially very high in this plant community. Reduced surface cover, low plant density, low plant vigor, loss of root biomass, and soil compaction, all contribute to decreased water infiltration, increased runoff, and accelerated erosion rates. Significant economic inputs, management and time would be required to move this plant community toward a higher successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production capability, but management changes would be needed to maintain the new plant community.

This plant community can possibly be renovated, depending on the slopes, to improve the production capability, but management changes would be needed to maintain the new plant community. The total annual production ranges from 200 to 500 lbs/ac. (air-dry weight) depending upon growing conditions.

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Removal of disturbance and long-term prescribed grazing, including adequate rest periods, will move this community through the successional stages, and may eventually lead to a plant community resembling the (HCPC) *Bluestem/Prairie Sandreed Plant Community* or associated successional plant communities assuming an adequate seed/vegetative source exists. This process will take a long period of time (50+ years).

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Bluestem/Prairie Sandreed Plant Community:

Low Density, Excessive Litter Plant Community:

Little Bluestem/Needleandthread/Sedge/Blue Grama:

Sedge/Blue Grama/Creeping Juniper Plant Community:

Annual/Pioneer Perennial Plant Community:

Animal Preferences (Quarterly – 1,2,3,4[†])

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
rasses & Grass-like							
big bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
blue grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
cheatgrass	U D U U	N P U N	U D U U	N P U N	N P U N	U D U U	U D U U
hairy grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
little bluestem	U D D U	N D N N	U D D U	N D N N	N D N N	U D D U	U D D U
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
plains muhly	U U D U	U U D U	U U D U	N N N N	N N N N	U U D U	U U D U
porcupine grass	U P U D	N D N U	U P U D	N D N U	N D N U	U P U D	U P U D
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie sandreed	U D D U	U D U U	U D D U	U U D U	U U D U	U D D U	U D D U
red threeawn	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
sand bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
sand dropseed	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
Scribner panicum	U U D U	N U N N	U U D U	N U N N	N U N N	U U D U	U U D U
sideoats grama	U D P U	U P D U	U D P U	U P D U	U P D U	U D P U	U D P U
sun sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
threadleaf sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
western wheatgrass	U P D U	N D N N	U P D U	N D N N	N D N N	U P D U	U P D U
rbs							
American pasqueflower	N N N N	N U N N	N N N N	N U N N	N U N N	N N N N	N N N N
bracted spiderwort	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
cutleaf ironplant	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
erigonum	U U D U	U U U U	U U D U	U U U U	U U U U	U U D U	U U U U
gayfeather	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
goldenrod	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
green sagewort	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
hairy goldaster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	N N N N
Hood's phlox	U D U U	U P P U	U D U U	U P P U	U P P U	U D U U	U P P U
Indian breadroot	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
Lambert crazyweed	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
penstemon	U U U U	U P P U	U U U U	U P P U	U P P U	U U U U	U P P U
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
prairie smoke	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
purple coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
pussytoes	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
rush skeletonweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
scarlet globemallow	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U D D U
scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
silky prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
stiff sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
wavyleaf thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western wallflower	U D U U	N U U N	U D U U	N U U N	N U U N	U D U U	N U U N
rubs							
cactus	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
creeping juniper	U N N U	U N N U	U N N U	U N N U	U N N U	U N N U	U N N U
dwarf false indigo	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
fringed sagewort	U U U U	U U U U	U U U U	U D D U	U P P D	U U U U	U U U D
leadplant	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
rose	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U
shrubby cinquefoil	N N U N	N U D U	N N U N	N U D U	N U D U	N N U N	N U D U
skunkbush sumac	D U U D	D U U D	D U U D	D U U D	D U U D	D U U D	D U U D
western sandcherry	D P P D	D U U D	D P P D	P U D P	D U U D	D P P D	P U U P
yucca	D N N D	D U U D	D N N D	D U U D	D U U D	D N N D	D U U D
ees							
juniper	U N N U	U N N U	U N N U	D U U D	U N N U	U N N U	U N N U

N = not used; **U** = undesirable; **D** = desirable; **P** = preferred; **T** = toxic

[†] Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

The following table lists suggested initial stocking rates for cattle under continuous grazing (year long grazing or growing season long grazing) under normal growing conditions; however, *continuous grazing is not recommended*. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process and may need to be adjusted due to diet preferences of other types or kinds of livestock and/or other factors. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Plant Community	Production (lbs./acre)	Carrying Capacity ¹ (AUM/acre)
Bluestem/Prairie Sandreed (HCPC)	1800	0.57 ²
Low Plant Density, Excessive Litter	1600	0.50 ²
Little Bluestem/Needleandthread/Sedge/Blue Grama	600	0.19 ²
Sedge/Blue Grama/Creeping Juniper	450	0.14
Annual/Pioneer Perennial	-- ³	-- ³

¹ Continuous season-long grazing by cattle under average growing conditions.

² Stocking rates may need to be adjusted due to palatability and/or availability of forage.

³ Highly variable; stocking rate needs to be determined on site.

Hydrology Functions

Water is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic groups A. Infiltration rate is rapid and runoff potential for this site varies from very low to medium depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where short grasses form a dense sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting opportunities for upland game species. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products

No appreciable wood products are present on the site.

Other Products

Highly diversified plant community provides excellent opportunity to evaluate different types of potential plant materials.

Supporting Information

Associated Sites

(054XY025ND) – Sands

(054XY026ND) – Sandy

(054XY043ND) – Shallow Sandy

(054XY034ND) – Thin Sands

(054XY035ND) – Very Shallow

Similar Sites

(054XY025ND) – Sands (Sa)

[Does not receive additional moisture. Found on dry uplands, upslope from sandy terraces or loamy overflow sites, down slope from limy sands or shallow sandy sites. Similar landscape position as loamy, sandy, and clayey sites. Won't form a ribbon; indicator species are sand bluestem and prairie sandreed evenly mixed, some Canada wildrye, penstemon, and leadplant and western snowberry. This site has more production, thicker "A" horizon and a mollic epipedon, lime is deeper than 6 inches from the surface, less little bluestem, no plains muhly, sideoats grama, more prairie sandreed, different landscape positions]

(054XY026ND) – Sandy (Sy)

[Does not receive additional moisture. Found on dry uplands upslope from sandy terraces or loamy overflow sites, down slope from limy sands or shallow sandy sites. Similar landscape position as loamy, sands, clayey sites; will ribbon up to 1 inches. Indicator species are prairie sandreed with western wheatgrass and green needlegrass intermixed. This site has more production, thicker "A" horizon, a mollic epipedon, lime is deeper than 6 inches from the surface, less little bluestem, no plains muhly, sideoats grama, more prairie sandreed, different landscape positions]

(054XY038ND) – Thin Loamy (TLy)

[Deep and moderately deep soils, usually calcareous within 4 inches to the surface, found on knobs and/or sideslopes of hills and buttes. Will form a ribbon greater than 1 inch but not more than 2 inches. Up slope of loamy and down slope of shallow loamy ecological sites. Indicator species: western wheatgrass, little bluestem, plains muhly, porcupinegrass and sideoats grama, with Missouri goldenrod, dotted gayfeather, pasqueflower, purple coneflower and purple prairie clover, and shrubs like winterfat and prairie rose. This site has more western wheatgrass, plains muhly, green needlegrass and sideoats grama, less little bluestem, sedges, prairie sandreed and sand bluestem, similar production and soil depth.]

(054XY034ND) – Thin Sands (TSa)

[Deep entisol found on knobs and ridges of level to choppy sand blown plains; will not ribbon, found upslope from sands and sandy terrace sites. Indicator species: Sand bluestem, prairie sandreed and needleandthread evenly mixed, some Canada wildrye, penstemon, lemon scurfpea western ragweed, yucca, silky prairie clover and leadplant. This site has similar production with a thin "A" horizon, no mollic epipedon, but doesn't have lime within 6 inches to the surface, less little bluestem, no plains muhly, sideoats grama, more prairie sandreed and sand bluestem, different landscape positions.]

(054XY030ND) – Shallow Loamy (SwLy)

[Well drained soils > 10 and ≤ 20 inches to sedimentary bedrock that restricts root penetration. Surface layer will ribbon > 1 and < 2 inches. Upslope from thin loamy or loamy sites and sometimes down slope from very shallow ecological sites. Indicator species: little bluestem, plains muhly, needlegrasses and sideoats grama, with dotted gayfeather, purple coneflower and pasqueflower, and shrubs like broom snakeweed. This site has similar species but less little bluestem, sand bluestem, prairie sandreed and sedges, more plains muhly, green needlegrass, western wheatgrass, restrictive layer above twenty inches is not sandstone or gravels, slightly less production.]

(054XY043ND) – Shallow Sandy (SwSy)

[Some what excessively drained soils more than 10 less than 20 inches to sedimentary sandstone bedrock and/or gravels that restricts root penetration. Surface layer will ribbon less than 1 inch unless above gravels than more than 1 but less than 2 inches. Upslope from thin loamy, limy sands, sands or sandy sites and some times down slope form very shallow ecological sites. Indicator species: little bluestem, prairie sandreed, sand bluestem, and needle grasses, with dotted gayfeather, pasqueflower, purple coneflower and purple prairie clover, and shrubs like prairie rose and yucca. This site has less production, less little bluestem, porcupinegrass, big bluestem or sand bluestem and more blue grama, plains muhly, sedges and needleandthread, has a restrictive layer within twenty inches.]

Inventory Data References

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. All descriptions were peer reviewed and/or field tested by various private, State and Federal agency specialists. Those involved in developing this site description include: Dennis Froemke, NRCS Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; Stan Boltz, NRCS Range Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; L. Michael Stirling, NRCS Range Management Specialist; Dean Chamrad, NRCS Range Management Specialist; David Dewald, NRCS State Biologist; and Brad Podoll, NRCS Biologist.

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
SCS-RANGE-417	4	1979 – 1981	ND	Adams
Ocular Estimates	8	1995 – 2001	ND, SD	Corson, Dunn, Morton, Stark

State Correlation

This site has been correlated with Montana and South Dakota in MLRA 54.

Field Offices

Baker, MT	Buffalo, SD	Faith, SD	Mott, ND
Beach, ND	Carson, ND	Hettinger, ND	Selfridge, ND
Beulah, ND	Culbertson, MT	Killdeer, ND	Sidney, MT
Bison, SD	Dickinson, ND	Mandan, ND	Watford City, ND
Bowman, ND	Dupree, SD	McIntosh, SD	Wibaux, MT

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43a – Missouri Plateau.

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (<http://hpccsun.unl.edu>)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (<http://wcc.nrcs.usda.gov>)

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, NRCS, Various Published Soil Surveys.

Site Description Approval

State Range Management Specialist

Date

State Range Management Specialist

Date

State Range Management Specialist

Date